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Exposure to risk factors for development of lower limb osteoarthritis during Navy New Entry Officers' Course

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Background and aims

Extrinsic factors, such as exposure to high and repetitive joint loading, particularly in occupations with high physical demands, have been associated with increased risk for development, and worsening, of lower limb osteoarthritis (OA).

The aims of this study were to a) analyse the exposure of Australian Navy Officer trainees to occupational tasks associated with an increased risk of developing lower limb OA, and b) identify projected timeframes for Navy officers to reach threshold exposures that may increase risk of developing lower limb OA.

Methods

- A desktop analysis of the 22-week Navy New Entry Officers' Course (NEOC) was undertaken to identify frequencies and durations of exposures to selected physically demanding occupational tasks. Observations of NEOC trainees during training days were undertaken to validate the desktop analysis
- Surveys of training officers were used to triangulate the program in the desktop analysis in relation to the training days observed
- A Job Exposure Matrix was developed using this data and compared to threshold exposures recognised by the Australian Repatriation Medical Authority's (RMA) Statements of Principles to be associated with increased risk of developing lower limb OA
- Projected exposures assumed that exposures in officer training would continue at the same rate post-training.
- Ethics approvals were obtained from the Defence and Department of Veterans' Affairs Human Research Ethics Committee (Protocol number: 037-18) and the Bond University and Charles Sturt University Human Research Ethics Committee



Photo by: ABIS Jarrod Mulvihill.
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Based on the rate of exposure to **heavy lifting (>20kg)** Navy officers could reach the reasonable hypothesis scenario's threshold representing **increased risk of developing OA in the lower limbs 6 years and 1 week after enlistment**

Officers posted to a sea vessel after training could meet the RMA-specified reasonable hypothesis scenario's threshold for **climbing stairs or ladders within 366 days of first posting.**



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Results

The estimated timepoint at which the RMA-specified threshold, under the reasonable hypothesis scenario, could be met for having lifted weights of over 20kg to a cumulative total for 100,000kg was 6 years and 1 week following commencement of training.

Officers posted to a sea vessel following completion of NEOC were likely to meet the RMA-specified reasonable hypothesis scenario's threshold of 366 days of climbing > 150 stairs or ladders in any 2 year period within 366 days of first posting.

Cumulative exposures to carrying loads >20kg and to kneeling or squatting for more than a cumulative total of one hour each day were not projected to meet threshold levels known to increase risk of developing lower limb OA.

Conclusion and implications

There may be an increased risk of Australian Navy officers developing lower limb OA due to cumulative exposure to lifting heavy weights (>20kg) and climbing stairs or ladders, the latter particularly for those posted to sea.

Given the financial and health burden of OA for Veterans, a review of initial officer training and service demands may be warranted to consider long-term impacts of cumulative exposure to lifting heavy weights (>20kg) and stair and ladder climbing and to reduce these where feasible.

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